

REMARKS

In the November 1, 2006 Office Action, Claims 1-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,230,713 to Schauer in view of Applicants' admitted prior art and further in view of U.S. Patent No. 6,032,359 to Carroll, and Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Schauer, Applicants' admitted prior art and Carroll, and further in view of U.S. Patent No. 5,735,697 to Muszlay.

Claim Rejections - 35 U.S.C. § 103

The rejections under 35 U.S.C. § 103(a) are respectfully traversed because a prima facie case of obviousness has not been established. Moreover, the claimed invention satisfies a long-felt need which was recognized, persistent, and not solved by others in the art. See Declaration Under 35 U.S.C. § 1.132 submitted concurrently herewith.

Initially, Applicants note that the method of forming, i.e. printing, the device is germane to the patentability of the device itself. Apparatus claims may recite either structural and/or functional features. See MPEP § 2114. Moreover, independent claims 1 and 6 do not recite a method of printing conductors on an insulating layer. Instead, the claimed invention recites conductors printed onto the insulating layer. Therefore, the claim invention does not cover what the cable does but covers what the cable is, that is including conductors printed onto one of its insulating layers, as is permissible. Furthermore, the claimed invention distinguishes the prior art, such as Applicants' Admitted Prior Art, by its structure and not by its function. More specifically, the cable of Applicants' Admitted Prior Art includes conductors adhesively bonded to the insulating layers. In contrast, the claimed invention recites a cable which includes conductors printed on the insulating layer. Moreover, the claimed invention recites that conductive material resides on the interior surface of the insulating layer. That is unlike the cable of Applicants' Admitted Prior Art in which the

conductors reside on an adhesive layer between the insulating layers and conductors. See page 3, lines 16-18 of Applicants' specification.

Next, the Examiner generally asserts that Applicants attack the cited references individually when they were used in combination to reject the claims. In response, Applicants note that a prima facie case of obviousness requires that all of the claim limitations be found in the prior art. Because all of the elements of the claimed invention are not found in any of the individual cited references, i.e. Schauer, Applicants admitted prior art, or Carroll, a prima facie case of obviousness has not been established. That is, even if all of those references are combined, all of the claim limitations of the claimed invention are not found in the combination.

No evidence has been provided that Schauer teaches that the conductors 11 *reside* on an interior service of cable 10. The Examiner asserts that on page 10, lines 9-12, that the conductors 11 (illustrated as dashed lines) are adjacent to the interior surface of the ribbon cable 10. However, the terms "adjacent" and "reside" are not the same thing. The term "reside," as used in the claims, requires that the conductors actually be located on the interior surface. Nothing in Schauer teaches that the conductors 11 are on the interior surface. Instead, the Examiner is merely assuming that the conductors are on the interior surface of cable 10. One skilled in the art, however, would recognize that it is more likely that the conductors 11 are next to the cable layers and not that they actually reside on the layers.

The Examiner also generally asserts that Carroll teaches that it is known to have conductors printed onto a substrate, and thus teaches the claimed invention. See for example the Examiner's arguments on page 10, line 13 – page 11, line 5. However, Carroll does not teach what is actually claimed and thus fails to cure the deficiencies of Schauer or Applicants' submitted prior art. Specifically, nothing in Carroll teaches or suggests conductors located between two insulating layers of a cable with conductors printed on one of

those layers so that a thin layer conductor material resides on an interior surface of that layer, as recited in the claimed invention. Instead, Carroll merely describes related art as including a flexible circuit that includes a dielectric substrate with conductive inks printed on its surface to define circuit traces.

The Examiner also suggests that it would have been obvious to substitute the flexible conductors of Carroll which the Examiner alleges seem to be thinner than the conductors of Schauer and Applicants' admitted prior art to have a more flexible cable. See page 13, lines 7-12 of the Office Action. However, the Examiner also argued that Schauer specifically teaches that its conductors 11 are "particularly thin." See page 10, lines 10 and 11 of the Office Action. Accordingly, it would not have been obvious to substitute the alleged thin printed conductors of Carroll for the "particularly thin" conductors 11 of Schauer since both types of conductors are thin, and thus would not result in a more flexible cable.

Long-Felt Need

Even assuming the prior art, as combined in the Office Action, does establish a prima facie case of obviousness, that is overcome because the claimed invention satisfies a long-felt need, and therefore obviates the rejection under 35 U.S.C. § 103(a). As outlined in MPEP § 716.04, there are three elements for establishing a long-felt need. The Declaration Under § 1.132 establishes that all three elements are satisfied, thereby overcoming the rejection under § 103.

Element 1 - Need must have been a persistent one that was recognized by one of ordinary skill in the art.

As outlined in the Declaration, conventional clocksprings used in motor vehicles typically employ a small number of conductors: 5 conductors at the most; 2 for the airbag circuit and 3 for other steering wheel functions, e.g. horn and speed control. Automakers have increased the quantity of steering wheel mounted control devices to include controls for

the audio system, transmission shifting, telephone, and the like. This trend greatly increased circuit density requirements against a backdrop of continuous price reduction demands. Thus, there has been a long-felt need for a single high circuit density cable for clocksprings to accommodate the increase in conductors and electrical conductors, as described above.

The flat cables used in commercial clocksprings have traditionally employed flat copper conductors laminated between two sheets of polymer film. Using conventional lamination methods, the lower limit of the width of the flat copper was restricted. Because the width of the cable was restricted by the maximum thickness of a clockspring assembly, an upper limit on the quantity of parallel conductors that could be laminated in a conventional flat cable was restricted.

Element 2 - Need has not been satisfied by another

Prominent suppliers of clocksprings have attempted to solve this problem by use of two or more flat cables, thus allowing two or more times the amount of circuits to be used. See for example U.S. Patent No. 5,865,634 at col. 1, line 61- col. 2, line 2 and U.S. Patent No. 6,109,942 at col. 1, lines 41-43 and 62-64, which identify the problem of the need for increased circuit density and attempt to solve this problem by using two or more flat cables. Additionally, Furukawa Electric Company also manufactured and employed two flat cables with its clocksprings to address the increased circuit density need. Although use of two flat cables provides use of more conductors, the costs are doubled, and complexity and weight are added to the clocksprings. Moreover, the additional moving cables contribute to undesirable sound emanating from the as the clockspring as it is rotated.

Element 3- Claimed invention in fact satisfies the need

The claimed invention satisfies the need for increased circuit density, at a low cost, in a flat cable. Specifically, each of independent claims 1 and 6 recite a flexible cable that include conductors spaced between a pair of insulating layers so that the conductors are

printed onto one of the insulated layers so that a thin layer of conductive material resides on an interior surface of one of the insulating layers. By printing the conductors on the interior surface of one of the insulating layers such that the conductive material resides on the interior surface, a much greater density of conductors is provided in the cable. Accordingly, only a single cable is required to meet the requirements of the recent control devices added by automakers, such as steering wheel mounted devices, audio system, transmission shifting, telephone, etc.

In view of the above, Applicants believe any proposed *prima facie* case of obviousness has been overcome because the claimed invention satisfies a long-felt need recognized in the art. Therefore, Applicants request reconsideration and withdrawal of the rejection of independent Claims 1 and 6 under 35 U.S.C. § 103(a).

Dependent Claims 2-5 and 7-11 are also allowable for the same reasons. Moreover, these claims recite additional features not found in the prior art. With respect to dependent Claims 4 and 8, the Examiner asserts that Schauer teaches soldering, as recited in those claims. However, the Examiner ignores the contradictory teaching of Carroll which has been combined with Schauer to reject those claims. In order to combine Carroll with Schauer, the solder connection taught by Schauer is eliminated by the teachings of Carroll. That is because Carroll specifically teaches putting cuts in substrates to provide a solderless connection.

Regarding dependent Claims 5 and 9, the Examiner asserts that those claims do not recite a solder connection. However, Claims 5 and 9 do recite that the contacts are *secured* to the circular apertures. Carroll teaches inserting pins through apertures; however Carroll does not teach securing the pins to the apertures.

Regarding dependent claim 10, the connector of Muzslay does not teach a mounting header located on an intermediate portion, therefore a *prima facie* case of obviousness has not

been established. If the connector of Muzslay is interpreted as a mounting header located in an intermediate portion, then portions 130F and 130Q cannot be characterized as extreme portions. Alternatively, if portions 130F and 130Q are interpreted as extensions, then the connector 12 A must be characterized as an extreme rather than an intermediate portion. The Examiner has failed to indicate how this interpretation of Muzslay is incorrect. Thus a prima facie case of obviousness has not been established with respect to Claim 10.


In view of the foregoing, Claims 1-10 are believed to be in allowable condition.

Prompt and favorable treatment is respectfully solicited.

Please charge any shortage of fees or credit any overpayment thereof to BLANK ROME, LLP, Deposit Account No. 23-2185 (115584-00343).

Respectfully submitted,

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